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**JPL INITIATIVE
ON
HISTORICALLY BLACK COLLEGES AND UNIVERSITIES**

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I. Background

Executive Order #12320 of September 15, 1981, established a program designed to significantly increase the participation of historically black colleges and universities (HBCUs) in Federal programs. Because of its geographical remoteness and position as a contractor operated center, JPL had not participated in grant and training programs with the HBCUs. In recognition of our responsibility to the national commitment on behalf of the historically black colleges and universities, this paper describes an initiative with effective, achievable guidelines and early progress for a better and more productive interaction between JPL and the HBCUs.

While responding to the Federal mandate, the JPL initiative contributes to our University research base and our ability to recruit capable engineers and scientists. The historically black colleges and universities are staffed with motivated, competent and experienced scientists and engineers and graduate students. They have performed excellent research for other NASA centers. It is in the interest of JPL to tap this capability in meeting our research needs. Therefore, key elements of this initiative provide efficient mechanisms to allow for the granting of research funds to enable consulting, fellowships, academic part time, and summer employment for faculty and graduate students and to provide a means for JPL employees to attend these schools. This will provide the opportunity for students to learn, about both technology and JPL.

II. Program Content

Numerous areas of interaction with the historically black colleges and universities have been identified and are being implemented. They have two broad objectives, research interactions and faculty/student interactions. Plans and progress to date for each specific area are summarized below.

1. Research Grants

The fundamental mechanism for promoting research at the HBCUs is through a grant. Although JPL is barred from directly issuing grants due to our contractor status, a mechanism has been established to allow NASA to issue grants in our behalf. If funding for a grant is available entirely at NASA Headquarters, the grant is issued directly by NASA with JPL named as the technical monitor. If JPL wishes to release funds to use on a grant, JPL returns those funds to NASA and NASA similarly issues a grant and names JPL as technical monitor.

The responsibility for providing grant money and identifying research areas is with the Technical Divisions at JPL in concert with JPL's program offices. Through informal discussion and announcements of opportunity, appropriate HBCUs are apprised of the need for work. In making JPL research

interests known to HBCUs, emphasis is placed on individual-to-individual interfacing. Contacts among technical personnel and visits between institutions are encouraged. The HBCUs will respond with unsolicited proposals to accomplish the work, as germane to their academic needs and focus. We also submit to NASA a correct, exciting, and timely description of the Laboratory and its needs for inclusion in the NASA Initiative with Historically Black Colleges and Universities.

Review criteria have been pre-established and are included in information to prospective applicants to ensure that they have a prior understanding of the bases for evaluating their proposals. They include technical and programmatic relevance to JPL's objectives, scientific or engineering merit, qualifications of the investigator, qualifications of the investigator's institution, and overall cost. After review, the proposals, evaluations, and evaluation summaries are returned for further action - either a request to the Grants Program Analysis Officer, NASA Code U, for a grant award or a letter declining the proposal.

Funds are provided from one or more of the following four possible sources; 1) Redirection of JPL funds through the appropriate NASA headquarters program office to Code U, 2) Transfer of uncommitted NASA Headquarters program office funds to Code U, 3) Matching or enabling funds provided by NASA Headquarters EEO, Minority University Program, Code U, or 4) Other NASA program offices, centers or other government agencies. Upon receipt of the proposal and summary, Code U first obtains NASA program office concurrence that the proposed project is appropriate. Technical and administrative monitoring of the grant is the responsibility of JPL.

For each grant, there is a task manager who is responsible for coordinating all technical administrative and monitoring activities with the appropriate program office. Semi-annual and annual technical status reports are required of the grantee to assist in monitoring the grantee's progress.

At present, slightly over 20 proposals and white papers have been received and reviewed. Of these, six have been selected for funding and their status ranges from under negotiation to funding in place. Most of the the remaining proposals are still under consideration, frequently in a continued effort to develop necessary funding.

2. Technical Clinics

Claremont College in Claremont, California has, for many years, operated a Mathematics Clinic and an Engineering Clinic for JPL. These clinics were established to give undergraduate and graduate students experience with "real-world" problems in math. To make use of the clinic, an organization (company, government agency, etc.) contracts with a clinic to perform research on a particular problem. The clinic utilizes undergraduates under the guidance of a professor to seek the solution to the problem. This provides an excellent educational experience for students while making low cost talent available to the contracting organization. Further, it allows the student and contracting organization to better know each other.

While these clinics are sponsored by JPL, they are available to the rest of NASA and to industry. It is in JPL's interest to maintain close contact with the clinic through a guidance committee in order to assure a close interaction between JPL and the school's faculty and staff.

It is our intent to encourage the establishment of clinics at the HBCUs as appropriate to the school's area of interest. JPL's role is to sponsor the establishment of the clinic through the use of research grants as well as the sponsoring of actual clinic problems. We envision clinics in spectroscopy,

remote sensing, materials, and computer science. At present, no specific working relationships have been identified.

3. Equipment Loan

An existing NASA program makes unused JPL equipment available to colleges and universities in support of their research programs. Most elements of the transfer of equipment to support a grant at an HBCU by JPL are covered under existing procedures. In addition to this provision for loans, equipment which has been transferred to a school in support of a grant may frequently be abandoned in place at the conclusion of a research grant. The existence of a Memorandum of Understanding between JPL and a specific HBCU normally contains a statement advocating equipment transfer as a goal. This may also serve as a mechanism for transfer of equipment. In addition to assisting JPL and HBCUs in the administrative aspects of a transfer, this initiative may be able to assist in the financial aspects of transfer costs and instructions on equipment operation to the HBCU staff. As part of this initiative, a group at JPL working with data visualization problems has begun the transfer of film readers and software for Video Imaging Communication and Retrieval to Jackson State University. This capability at Jackson State is expected to result in continued joint efforts between the two groups.

4. Facilities Use

An existing NASA program allows colleges and universities to use JPL facilities on a non-interference basis for the enhancement of their research programs. Again, the JPL Initiative provides a mechanism for specific attention to the needs of HBCUs.

5. Personnel Loan Program

Another potential interaction is a personnel loan program whereby JPL employees are sponsored as visiting faculty at an HBCU. This employee spends one to two years at the candidate school performing teaching and research duties. Ideally, a research grant accompanies the employee to allow JPL sponsored research to be accomplished by a JPL employee and his/her students. The approval and awarding process for these grants follows the procedures outlined earlier.

The HBCU would normally provide support for the teaching/research activities including supplies and course expenses, equipment (leasing only), transportation expenses (related to University work), student assistant wages, and applicable university burden costs. A Memorandum of Understanding (MOU) between the JPL employee and the cognizant JPL organization detailing the terms is normally required.

At present, Dr. Kofi Apenyo from JPL is on loan to the Dolphus E. Milligan Research Institute of the Atlanta University Center. He will be teaching and doing research on database query systems for about 2 years.

6. Cooperative Education

Utilizing a highly successful existing program, undergraduate students are invited to take part in co-op programs. This program provides practical experience for students and develops a bonding between those students and JPL. Cooperative education programs are now in place between JPL and several schools. These programs will be extended to other schools as appropriate.

The Cooperative Education Program is designed to give undergraduate students an opportunity to prepare for a career with on-the-job training as a supplement to classroom instruction. Periods of classroom-related, fully paid employment alternate with periods of full-time study. In addition, work experience is supplemented by weekly meetings of Co-op students including information on projects in progress at the Lab and tours of various Lab facilities, as well as career and skill-development programs. These latter learning experiences serve both to broaden the student's technical base as well as provide an understanding of operating procedures at JPL.

In order for a student to be eligible for the JPL Cooperative Education program he/she must be enrolled in a Cooperative Education Program at a college or university with whom JPL has a signed Co-op agreement, be in good academic standing, have at least a 3.0 grade-point average on a 4.0 scale, and meet the regular JPL employment criteria. Work assignments are normally designed so that they may be completed during a six month time period and include scientific, technical, or administrative assignments. The difficulty and responsibility of the task depends on the position, experience, and interest. In addition, students are given the opportunity to learn new technical fields and organizational procedures.

Included are salary and a weekly housing allowance for eligible students. Limited funds may be available to support the hiring of minorities and women and every effort is made to ensure that a majority of the Co-op employees are females and/or minorities. All school expenses are the responsibility of the student.

JPL has had a small number of students from HBCU's as co-op students each year from the 4 HBCUs involved. These numbers are expected to increase as this initiative becomes fully effective.

7. Summer Employment

An existing summer employment program has provided a rich work experience for hundreds of students. Unlike the co-op program, this effort is not specifically tied to a course of instruction and is available to graduate students and faculty. It provides learning opportunities for participants as well as direct benefit to JPL for work conducted. Because the HBCU schools are outside of California, special provision for travel and housing expenses is made to make the program more attractive. The existing summer program budget is augmented by Minority Office funds to assure that HBCU hiring goals are realistically met. The intent is to enhance and increase the capabilities of minority scientists in JPL's hiring pool. This assists in the recruitment of college graduates as regular Laboratory employees. Not infrequently, summer faculty positions have been filled by professors in science, engineering, and business administration from universities where JPL frequently recruits.

College-level students are preferred, particularly those majoring in science, engineering and business administration. Student summer employees must have plans to return to school in the fall. Candidates from schools where the Laboratory regularly recruits are given preference. The minimum hiring age is sixteen. Salaries are based on a set salary structure in accordance with the student's academic standing at the beginning of summer.

Here as with the co-op program, the number of students involved is expected to increase as knowledge of our program is disseminated throughout the HBCU's.

8. Faculty Resident Program

A Faculty Exchange Program to employ faculty on leave or sabbatical for 6 months to one-year periods has been established. This provides an excellent opportunity for HBCU faculty to learn about us and for us to establish long-term ties to HBCUs.

This program is designed to further the interaction with HBCUs in the employment of faculty members in Laboratory research or project activities while in residence at JPL. Selected faculty members spend one or more academic units (quarter or semester) at the Laboratory working in an area of their choice and expertise, as part of an existing JPL team/group. This arrangement is renewable for up to two years.

Interested faculty members submit curriculum vitae to the Manager of Historically Black Colleges and Universities Initiative, together with a brief description of the activity they would like to be associated with as well as an endorsement from their dean or department head. JPL then circulates the applicant's material to potentially interested Laboratory organizations. Pre-established contacts between faculty and JPL staff greatly enhance successful selection. JPL positions are open to any bona fide faculty member for whom an appropriate position can be identified. Faculty interactions with an HBCU are also facilitated through existing programs such as the NASA Summer Faculty Fellowship. This program is NASA-wide and JPL is involved. It invites engineering and science educators who have interests in common with a professional peer at JPL to spend ten weeks during the summer on research here.

At present, no faculty have been placed at JPL under this Initiative.

9. Minority Fellowship Program

The Minority Fellowship Program is instituted as a JPL Affirmative Action Program to 1) provide JPL under-represented minority employees with an attractive opportunity to acquire an undergraduate or graduate college degree, 2) provide an employment incentive to attract newly graduated minority scientists, engineers, and administrative personnel, and 3) improve our level of interaction with HBCUs through direct contact between JPL employees and HBCU staff.

To meet these goals, the Minority Fellowship Program provides a full fellowship to deserving candidates. This includes full tuition and salary and benefits during full-time study at an HBCU. Fellowships are awarded for a maximum of five years. To assure that the employee has high career potential at JPL, that there is a reasonable chance that he will pursue a long-term career at the Laboratory and that he has a reasonable chance of successfully completing a degree program, the following conditions for candidacy apply:

- 1) The employee must pursue a course of instruction in a technical or administrative discipline that is appropriate for employment at JPL;
- 2) The employee must have at least 2 years of experience at JPL;
- 3) The employee must have completed at least 2 years of college;
- 4) The employee must have exhibited a high potential for a successful career at JPL;
- 5) The employee must demonstrate financial need; and
- 6) The employee must be willing to agree to 3 years work at JPL after completing his degree.

Appointments are made by a committee established by the assistant laboratory director. This committee administers, coordinates and monitors the program. Fellows must make consistent, appro-

priate and significant progress toward their degree objective, and progress is regularly reviewed. If a Fellow's progress is deemed to be below reasonable expectations in terms of attendance, grades, etc., appropriate remedial action is recommended.

Award of a fellowship is contingent upon the candidate being accepted by the proposed college or university within six months following selection. Acceptance prior to application for the program is preferred and enhances the applicant's chance for a fellowship.

The first group of applicants is being reviewed at this time for inclusion under this element of the initiative. The number is expected to be small, only 2 to 4, because of the limited funds available to support this part of the initiative.

10. Operation Pipeline

The intent of this activity is to outline a long-range development program to increase interest of local minorities in the math and science fields, leading to eventual graduation from an HBCU in a field related to the work of the Laboratory. JPL has participated in a very successful program with Elliot Middle School in Pasadena, California. In an extension to that program, we are pursuing a "pipeline" program that monitors and helps the progress of gifted students identified at Elliot and other schools as they progress toward college. Besides enrichment programs and summer or part-time employment at JPL, students are eligible for scholarships made available by HBCUs to fund their study at an HBCU. In most cases, this element does not introduce new activities, but serves as a continuous thread tying the various existing activities together and applying them to individual students.

Major program goals are to (1) develop student interest in math and science, 2) provide training for minorities who exhibit potential for success in the fields of science and math, 3) provide some financial support for needy and deserving minority students, and 4) provide a pool of talented minorities at JPL who have both experience and supporting education.

As an addition to the existing JPL Outreach Program to improve science teaching at the grade school level in our local area, a joint effort involving the University of the District of Columbia is under negotiation.

III. Technical Interchange Workshop

As part of the Initiative, JPL sponsors an Annual Technical Interchange Workshop involving the HBCUs taking part in the JPL program. Held at JPL, the Workshop primarily focuses upon the research grants and clinics. As appropriate, Workshop sessions also review and discuss progress in faculty and student interaction programs. It is the intent of JPL that the Workshop also be available as a forum to discuss the challenges of HBCUs as they work toward a strengthened competitive status in taking part in NASA and JPL work. The purpose of this conference is to:

1. Encourage annual interaction between faculty at historically black colleges and universities (HBCUs) and JPL personnel involved in sponsored research;
2. Familiarize JPL personnel with HBCU research capabilities; and
3. Further develop NASA supported HBCU research.

The conference also provides a forum to discuss, evaluate, and recommend appropriate changes in JPL/HBCU research interactions.

The initial conference occurred in May 1988. JPL personnel involved in this orientation included personnel from sections where research interests exist; contract management staff; recruitment staff, and other appropriate laboratory individuals. The second is planned for June 13 and 14, 1989. A number of additional schools are expected to take part this year.

IV. Supporting Organization

A division-level manager in the Technical Divisions serves as manager of the JPL HBCU initiative. This position is presently filled by Dr. Martin H. Leipold who acts as advocate to the technical divisions and program offices, provides information for and assures correct reporting to NASA, and monitors the performance of the varied activities. He is assisted by an Initiative Administrator, Mr. Paul Forte, who is responsible for generating required reports and coordinating initiative activities with managers from the Administrative Divisions.

The office of the Director at JPL has appointed a Steering Committee to review the actions taken or to be taken in the HBCU program and to provide guidance in the proper operation and functioning of the program at JPL and NASA. This committee reports on the activities being conducted as a part of the total HBCU Program. It is presently chaired by Dr. A. Zygielbaum.

The Initiative Manager and Administrator generate and distribute an annual plan showing important dates covering the mechanics of the initiative and establishing goals for participation by Laboratory organizations.